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An anomalous diffusion model in an external force fields on fractalsy

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Abstract

We present a fractional diffusion equation involving external force fields for transport phenomena in random media. It is shown that this fractional diffusion equation obey generalized Einstein relation, and its stationary solution is the Boltzmann distribution. It is proved that the asymptotic behavior of its solution is stretched Gaussian and that its solution can be expressed in the form of a function of a dimensionless similarity variable, not only for constant potentials but also for logarithm, harmonic, analytic and generic potentials. A comparison with the fractional Fokker-Planck equation is given.

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